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CURRENT LITERATURE

NOTES FOR STUDENTS

Morphology of Nidularia.—In two papers FRIES has given a clear account of the morphology of the fruit-body and spore development of *Nidularia pisiformis* Tul. The first paper deals with the development of the fruit-body.[1] The youngest stages observed are nodules about 0.4 mm. in diameter. In the earliest stages these are differentiated into a uniform medulla and a cortex which become more pronounced later. All the cells are binucleate. The medulla soon becomes differentiated into a lower sterile portion and an upper denser portion in which the peridiola arise. The beginning of the peridiola is indicated by the appearance of islets of hyphae, rich in protoplasm, growing toward common centers. These hyphae represent the young hymenium. Later a cavity is formed by the expansion of these hyphae and those of the subhymenial layer. The peridiola, spherical at first, assume an oval form. A wall is formed around them, but this at first remains open at the poles. Through the openings the peridiola remain in connection with the surrounding medulla during their growth; the wall finally incloses the whole peridiolum. The development agrees in the main with the development of the fruit-bodies of other members of this peculiar group of Gasteromycetes, except that the peridiola are not connected to the wall of the fruit-body by strands of hyphae as in *Crucibulum* and *Cyathus*.

In the second paper[2] an account of spore development of the same plant is given. The young basidia are binucleate, agreeing in this respect with other Basidiomycetes, as well as with the ascus of Ascomycetes. The two nuclei grow to about twice the size of the vegetative nuclei, after which fusion takes place. This is followed by the usual rapid growth of the fusion nucleus just previous to the divisions leading to spore formation. The chromatin, which is in the so-called synapsis stage, later spreads out through the nuclear cavity in the form of an irregular band, which is single at first, but later appears to split lengthwise into two parallel threads. The chromatin thread shortens and thickens and breaks up into a number of double chromosomes. This process was not easily made out, but the author is inclined to believe that two such double chromosomes are formed, although some earlier stages seemed

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[1] FRIES, ROB. E., Om Utvecklingen af Fruktkroppen och Peridiolerna hos *Nidularia* (with German résumé). Svensk. Bot. Tidsk. **4**:126–138. *pl. 1. fig. 1.* 1910.

[2] ———, Ueber die cytologischen Verhältnisse bei der Sporenbildung von *Nidularia*. Zeitschr. Bot. **3**:145–165. *pls. 2.* 1911.

to show three to five segments. The spindle of the first division is transverse to the long axis of the basidium, as in the whole series of Basidiomycetes, beginning with the Tremellales. The processes of division are very obscure, but there appeared to be three or four chromosomes at each pole in the anaphase. The author interprets this as a heterotypic division, but believes that during the division the components of the double chromosomes become separated, thus accounting for the presence of four instead of two at each pole. The second division proceeds without reorganization of the daughter nuclei. It results in the distribution of the components of the double chromosomes to the new nuclei. Two chromosomes appear at each pole of the spindles. The whole interpretation hinges on the correctness of the author's assumption that only two segments are formed from the double chromatic band after synapsis.

After the reorganization following the second division of the nuclei, the sterigmata bud out from the basidia and swell out into spore bodies. Then the peculiar process of migration of the nuclei into the spore bodies takes place. The nuclei move to the upper part of the basidium and lose their membranes, leaving only the nucleolus and chromatin. The chromatin thread, with the nucleolus at its apex, then migrates through the narrow sterigmata into the spore cavity. This peculiar migration is explained by the fact that during the process the nuclei are in the prophase of a division which is completed as soon as the chromatin has entered the spore cavity. The mature spore is binucleate, corresponding in this respect with other Gasteromycetes that have been investigated.—H. HASSELBRING.

Hereditary factors in Primula.—The existence of numerous varieties of the Chinese primrose (*Primula sinensis*) makes this species an enticing one for the study of unit characters in inheritance, but the number of different factors is so great as to make complete analysis practically impossible. Factors for form of foliage, heterostylism, singleness of the flower, color of stems, color of flowers, palliators, inhibitors, pattern factors, coupling, and repulsion, are all needed in the description of the results. During the past eight years BATESON and GREGORY have been analyzing the characters which distinguish the different varieties, and they have jointly and severally reported on various phases of their results from time to time since 1903. GREGORY[3] has just presented a comprehensive memoir on these experiments, illustrated with three excellent double plates, two colored and one photographic. Some of the more interesting results may be mentioned. Long style is epistatic to short style; palmate type of leaf to the pinnate or "fern" type; crenate margins to entire margins; single flowers to double; the flower colors may be arranged in a series in such manner that each is epistatic to all that follow, as follows: dominant white, magenta, red, blue, recessive white; some pale

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[3] GREGORY, R. P., Experiments with *Primula sinensis*. Jour. Genetics **1**:73–132. *pls. 3.* 1911.